12:48 p.m.

1116MP-207 **Tissue Level Perfusion After Primary or Rescue Coronary Angioplasty in Acute Myocardial Infarction: A Myocardial Contrast Echocardiography Study**

Luciano Agati, Carlo Iacoboni, Francesca De Maio, Stefania Funaro, Mariapina Madonna, Flavia Celani, Rachele Adorisio, Giulia Benedetti, Francesco Fedele, La Sapienza University of Rome, Rome, Italy

Background: The clinical usefulness of rescue coronary angioplasty (PCI) in patients with acute myocardial infarction (AMI) is still under discussion. In particular, no data are available on the effects of late infarct-related artery (IRA) reopening on microvascular perfusion. Echocardiographic assessment of microvascular integrity is now feasible by intravenously injected contrast agents and real time myocardial contrast echocardiography (rt-MCE). Previous MCE studies showed the efficacy of primary PCI in reducing microvascular damage. We sought to determine if even rescue PCI may improve tissue level perfusion. **Method:** We studied 48 patients with first anteroseptal AMI, undergoing primary PCI within 6 hours from symptoms onset (Group A, n=28 pts) or, on the basis of clinical symptoms, rescue PCI within 12 h after thrombolysis (Group B, n=20 pts). MCE was performed using real-time imaging (Philips Sonos 5500 or CnTI Esaote) during continuous infusion of SonoVue® (Bracco) with a prototype (Bracco Imaging) rotating infusion pump at 120-180 ml/h infusion rate. In both groups the endocardial length of contrast defect in apical 4- 5- and 2- chamber views, the contrast score index, left ventricular ejection fraction and the wall motion score index were calculated before and after PCI. TIMI grade flow and myocardial blush after PCI were also calculated. **Results:** The mean time to IRA reopening was significantly lower in the first group (3±1.5 vs 10±1.5 hours, respectively, p>0.001). Despite the different time to IRA reopening, similar changes in contrast score index (-11% vs -10%, ns), length of contrast defect (-64% vs -61%, ns), ejection fraction (+10% vs +4%, n.s), and wall motion score index (-11% vs -10%, ns) were observed.
There was no statistical differences among groups in TIMI grade flow and myocardial blush after coronary procedure (2.5±0.4 vs 2.4±0.4, and 1.2± 0.3 vs 1.1±0.2, respectively, ns) **Conclusions:** Our results suggest that even rescue PCI in still unstable patients after thrombolysis may be effective in reducing microvascular damage.

POSTER SESSION

1117 Novel Echocardiographic Methods for Assessing Coronary Artery Disease

Monday, March 31, 2003, Noon-2:00 p.m.
McCormick Place, Hall A
Presentation Hour: 1:00 p.m.-2:00 p.m.

1117-35 **Application of a Novel Ultrasound Transducer for Continuous Monitoring Treadmill Exercise Stress Echocardiography: Utility in the Detection of Coronary Artery Stenosis**

Kenichi Nakashiki, Akira Kisanuki, Yutaka Otsuji, Keiko Yuge, Toshinori Yuasa, Kunitsugu Takasaki, Takeshi Uemura, Bo Yu, Naoko Mizukami, Shuichi Hamasaki, Shinichi Minagoe, Chuwa Tei, University of Kagoshima, Kagoshima, Japan

Background and purpose: Treadmill exercise echocardiography is a physiologic tool to detect coronary artery stenosis, however, difficulty in monitoring left ventricular wall motion during the exercise limits its clinical utility. We tested the feasibility of a novel ultrasound probe, which can be attached to the LV apex chest wall and allow free rotation around long axis for continuous monitoring of LV wall motion during treadmill exercise.
Methods: Subjects consisted of 17 patients (15 male, 2 female, age 57±17 years old) with suspected ischemic heart disease. By attaching novel ultrasound probe to the apex, continuous recording of apical 4 and 2 chamber views and long axis view were performed in every 3 minutes during treadmill exercise stress with modified Bruce mothod. Development of new LV wall motion abnormality was compared with 70% or more stenosis by coronary angiography.
Results: (1)Continuous monitoring of left ventricular wall motion during treadmill exercise was feasible in 15 of 17 patients (88%). (2)Significant coronary artery stenosis was present in 8 of the 15 patients. (3)Newly developed LV wall motion abnormality was observed in 5 patients of the 8 patients with stenosis. (4)The sensitivity, specificity, and accuracy in the diagnosis of coronary artery stenosis by this novel continuous monitoring treadmill exercise echocardiography was 62% (5/8), 100% (7/7), 80% (12/15), respectively.
Conclusions: Continuous monitoring treadmill exercise echocardiography using a novel ultrasound probe enables noninvasive and physiological diagnosis of coronary artery stenosis.

1117-36 **Strain Rate Imaging Can Evaluate Nontransmural Myocardial Infarction: An Experimental Study in Dogs**

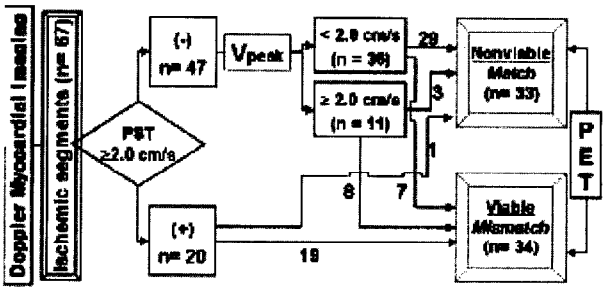
Tomohiko Toyoda, Takashi Akasaka, Maki Akiyama, Jyunko Tomita, Yoji Neishi, Yuji Koyama, Nozomi Watanabe, Shuichiro Kaji, Yasuhiro Saito, Ryoji Suetsuna, Kiyoshi Yoshida, Kawasaki Medical School, Kurashiki, Japan

Background: Non-transmural myocardial infarction is a common finding clinically. However it is difficult to evaluate the different change in contractile function between inner and outer layer. Strain rate imaging which derived from tissue Doppler imaging (Vivid 5, GE medical systems) can provide quantitative analysis of regional contractile function. Our aim is to examine whether strain rate imaging can evaluate nonuniform change of transmural contractile function by the experimental model in dogs.
Methods: In 5 open chest dogs we injected microspheres which were 600μm in diameter to the left anterior descending artery via the diagonal branch (n=2) or to the left circumflex artery via the posterolateral branch (n=3) by several times, which were able to make predominantly subendomyocardial embolization. Embolization was continued until regional coronary blood flow was reduced approximately 30% of baseline. Echocardiography which contained tissue Doppler imaging in the long axis view was performed during embolization. To evaluate embolized area, we performed myocardial contrast echocardiography (MCE) at baseline and after final embolization in 3 dogs. Data were recorded digitally, and strain rate and strain were calculated by off-line analysis. Sample length was set at 2.8-3.2mm, and placed at inner and outer half sides to analyze the regional contractile function in each inner and outer layer separately.
Results: After embolization, systolic wall thickening of embolized area was reduced gradually. Peak systolic strain rate and strain were significantly reduced in inner half layer (7.56±3.41 to 1.58±4.63, p<0.05, 30.8±18.4 to 9.5±16.7, p<0.05, respectively) more than in outer half layer (1.44±6.34 to 4.05±3.43, p=0.77, 8.9±15.3 to 5.3±7.2, p=0.27, respectively). Signal intensity of myocardium by MCE was also reduced in inner half layer more than in outer half layer (3.32±0.78A to 1.19±0.06A, 3.66±1.00A to 2.80±0.63A, respectively P<0.05).
Conclusion: Systolic strain rate and strain of inner layer of myocardium were reduced by embolization of 600μm microspheres in relation to the reduction of perfusion. Strain rate imaging has a potential to evaluate subendomyocardial infarction.

1117-37 **Diagnosis of Viable Myocardium Using Velocity Information of Doppler Myocardial Imaging: Comparison With Positive Emission Tomography**

Jae-Kwan Song, Hyun Suk Yang, Soo-Jin Kang, Jong-Min Song, Duk-Hyun Kang, Cheol Whan Lee, Myeong-Ki Hong, Jae-Joong Kim, Dae Hyuk Moon, Seong-Wook Park, Seung-Jung Park, Asan Medical Center, Seoul, South Korea

To test whether velocity data of Doppler myocardial imaging (DMI) is useful for diagnosis of myocardial viability (MV), 25 consecutive patients (16 male, 63.5±10.1 years) with regional wall motion abnormalities at the left anterior descending artery (LAD) territory and LV dysfunction (EF = 32.7±9.5%) underwent both DMI at rest and positive emission tomography (PET). Peak systolic velocity (V_{peak}) and postsystolic thickening velocity (PST) were measured in anterior septum, apical inferior and anterior wall. Among 75 ischemic segments of LAD, analysis of DMI data were not feasible in 4 segments, and PET was normal in another 4 segments; data of the remaining 67 segments were compared. PET showed MV (mismatch) in 34 segments and 33 segments showed non-viability. Although V_{peak} (1.6±1.7 Versus 1.3±1.0 cm/s, p=.42) and wall motion score index (2.9±0.4 Versus 2.8±0.3, p=.41) did not show any significant difference between segments with MV and those without, PST was higher in segments with MV (2.7±1.5 Versus 0.9±0.7 cm/s, p<.001). ROC curve of PST showed the best cut-off value for MV is 2.0 cm/s (area under the curve = 0.833, p<.001). PST≥2.0 cm/s showed sensitivity of 56% (19/34) for MV, and in segments with (-) PST, V_{paek}≥2.0 cm/s was another useful index for MV. This algorithm using DMI showed diagnostic sensitivity and specificity of 79% and 88%, respectively. Velcoity data of DMI at rest provides robust information regarding MV, and no need of any stress can be an advantage of this technique.



1117-38 **Left Atrial Volume: A Powerful Predictor of Survival After Acute Myocardial Infarction**

Jacob E. Møller, Graham S. Hillis, Patricia A. Pellikka, James B. Seward, Guy S. Reeder, R. Scott Wright, Seung W. Park, Jae K. Oh, Mayo Clinic, Rochester, MN

Background: After acute myocardial infarction (AMI), diastolic function assessed by Doppler echocardiography provides important prognostic information that is incremental to systolic function. However, Doppler variables are affected by multiple factors and may change rapidly. In contrast, left atrial (LA) volume is less influenced by acute changes and reflects subacute or chronic diastolic function. This may be of importance when assessing risk in patients with AMI. The current study tested this hypothesis.
Methods: Three hundred and fourteen patients with AMI who had a transthoracic echocardiogram with assessment of left ventricular (LV) systolic and diastolic function and measurement of LA volume during their index admission were identified. The LA volume was corrected for body surface area and the population was divided according to LA volume index of 32 ml/m2 (2 standard deviations above normal). The primary study endpoint was all-cause mortality.
Results: LA volume index was > 32 ml/m2 in 142 (45%) patients. During follow-up of 15 (range 0-33) months, 46 patients (15%) died. LA volume index > 32 ml/m2 was a powerful predictor of all-cause mortality (p < 0.001) and remained an independent predictor (risk ratio 2.8, 95% confidence interval 1.7 - 4.7, p<0.001) after adjustment for clinical